ABSTRACT OF THE DISCLOSURE

Several methods are presented for achieving a desired value of electrical impedance between parallel planar conductors of an electrical power distribution structure by electrically coupling multiple bypass capacitors between the planar conductors. The methods include bypass capacitor selection criteria based upon simulation results. An exemplary electrical power distribution structure produced by one of the methods includes a pair of parallel planar conductors separated by a dielectric layer, and n discrete electrical capacitors electrically coupled between the planar conductors, where $n \geq 2$. The n capacitors have substantially the same capacitance C, mounted resistance R_m, and mounted inductance L_m. The electrical power distribution structure achieves an electrical impedance Z at a mounted resonant frequency $f_{m\text{-}res}$ of the capacitors. The mounted resistance R_m of each of the n capacitors is substantially equal to $(n \cdot Z)$. The mounted inductance L_m of each of the n capacitors is less than or equal to $(0.2 \cdot n \cdot \mu_0 \cdot h)$, where μ_0 is the permeability of free space, and h is a distance between the planar conductors. The mounted resistance R_m of each capacitor is the sum of an equivalent series resistance (ESR) of the capacitor and the electrical resistances of all conductors coupling the capacitor between the planar conductors. The mounted inductance L_m of each capacitor is the electrical inductance resulting from the coupling of the capacitor between the planar conductors. The mounted resonant frequency $f_{m\text{-}res}$ results from capacitance C and mounted inductance L_m.